ANTHROPOGEOMETRIES IN THE URBANSCAPE: INTERROGATING THE ECHO OF GEOMETRY

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What else could geometry may mean besides a detailed and systematic metric encounter with earth (i.e. γεωμετρία = μέτρηση γης), as the etymology of the word suggests? Could notions of 'geometry' become supportive towards opening up how, today, we may reconfigure our relation with space and place at a time of crisis? And for whom? Could geometry enable us to reconfigure this relation as entailing a variety of topologies, figurations and meanings? Could we, with our student-teachers, children and locals endure a confrontation with the 'echo' of geometry in the urban scape as a continuum amongst the dis/appearance of its particularities, features, values, valorisations or, even, violations? A confrontation that involves a subtle interrogation of geometry's echo today.

INITIAL THOUGHTS

Inspired by Lefebvre's urge to open up fixed container images of a city, a house, or a street and to consider them as *"a complex of nobilities, a nexus of in and out conduits"* (Lefebvre, 1991, 92) we have been engaged into an urban (mathematical) intervention that aims for opening up not only the city, but also our experience with mathematics in the urban-scape of Volos. Based on the digital archive of 'street mathematics'[1] where the artwork of de Chirico geometric allegories are assembled, as well as, the contemporaneity of a small scale commercial urban neighbourhood at the centre of Volos, the AnthropoGeometries intervention was planned and implemented in a series of workshops with student-teachers, students and locals in this area (see Figures 1 and 2) with the intention to see the *horizon* and not just its objects as indicated by Merleau-Ponty (2003) in his notes on Husserl's Origin of Geometry.

Figure 1: de Chirico gallery (outside)

Figure 2: The Metamorphosis street

The choice to focus on de Chirico's artwork was due to the artist's connection to Volos as his birthplace and local eminence to the extend that a cultural gallery has been named

[1] See Chronaki, 2015 and http://streetmathematics.ece.uth.gr.

after him. Since the gallery had no real artwork of Giorgio de Chirico at possession (i.e. all of de Chirico artwork exist at his museum at Rome), it was of particular interest for our project to emphasize a virtual revival of his work (see Figures 2 and 3) but also to explore how locals may connect with him, his artwork, the vibrant visibility of geometry's 'voice' in it, and through this channel, to explore the 'echo' of geometry in the everyday of the urban neighbourhood (see Figures 4 and 5).

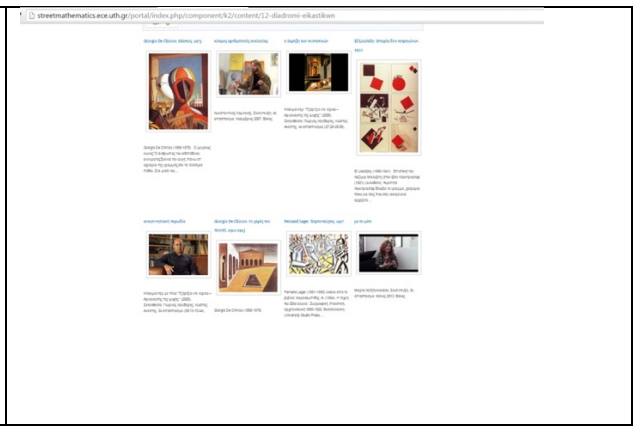

Figure 3: A virtual space of de Chirico gallery (inside) **Figure 4:** Assembling Geometries

STEPS INTO THE NEIGHBORHOOD

Based on the above materiality, a group of student-teachers and young students became co-participants in a research project where they had to get into the streets of the neighbourhood to meet the people who live and work there but also the passers and discuss with them de Chirico, his artwork, and geometry[2]. Having worked with an interdisciplinary team in the de Chirico gallery they got to know his artwork as well as to explore what questions to ask locals, why and how, student-teachers along with students moved out in the streets of the neighbourhood (Figure 5).

Figure 5: Student-teachers and students in the workshop and the neighbourhood

As a way of initiating their detour into the urban scape of Metamorphosis area they used of a number of de Chirico artwork images (see Figure 4). The gesture of starting a dialogue with locals invited a spur-of-the-moment re-entering into a manifold of mathematical 'epistemologies' and 'ontologies' that people's responses might carry. What are the memories that showing the artwork images might evoke in people's minds

[2] The research team comprised by mathematicians, educators, historian of art, artists, computer scientist, architect and thirty-two students from two different junior high schools (the 3rd junior high school of Volos and the Music School of Volos), as well as a team from the Roma minority collaborated in a two-month workshop. The average age of student-participants was 14 years old (see also Chronaki & Papasarantou, 2016, Chronaki, this volume).

and feelings? What is that they can say about geometry as they become invited to revisit the artwork of a painter who had spent time in their city? How such a gesture does open new avenues for imagining mathematical activity and its impact in our contemporary times and spaces?

Figure 6: Artwork by de Chirico for street interventions (Trobadour, El placer del Poeta, La Melancholie d' une belle journée, and Masks)

WITH THE LOCALS

Talking with locals a number of issues emerged around not only geometry, but geometry in relation to art and people's life and work. First of all, despite the legend around the artist, most people, even-though they knew de Chirico's name were not in position to recall any more information of either the artist or his art –denoting how not only mathematics but also art may remain inaccessible. However, describing his artwork, and especially the geometry's allegories was not only pleasant and interesting, but also revealing.

Figure 7: Locals and the Echo of Geometry

Particularly descriptions referring to the artwork of "Trobadour" and "Masks" were vibrant and related directly to their experiences. According to a local dressmaker's words, "Masks" represent two women from Renaissance. Her main argument was the shape of their heads. In her words "*The heads are oval-shaped so they can't belong to a man. Men's heads are more edged. These two figures are probably two women from the period of Renaissance because in those days women used to shave their heads in*

order to wear wigs". A local photographer made a lighter approach by comparing and connecting the two paintings: "*Ah! These are the robots! (Masks)… and this is his nose… oh! And this person (Trabadour) holds the spare nose of this guy while he is listening to music. He has a Walkman here and a pair of hands-free".* In the view of "Masks", a bookseller talked about an effort of the artist to represent an animated form through unanimated materials while an undergraduate student claimed that is a hollow face that tries to interpret his/her existence through geometry. For the pet shop owner "Trobadour" is a knight that we need today to save our lives while for the agriculturist it resembles a human Trojan Horse.

Most locals recognized geometric shapes or relations on the presented artwork and this act provided access to talk about worklife. All of them noticed at least one basic shape such as triangles, rectangles and/or circles. Few of them (5 out of 26) noticed geometric relations such as symmetry, parallels, as well as the use of geometry as a way to represent the dimension of depth. One of them (an immigrant builder) referred to the work of Evaristo de Chirico, the father of Giorgio de Chirico, and the impact he had to his son's paintings. A dressmaker related the presence of geometry to her own work in dress-design. In 'Trovadour' for instance she said that she did recognize geometric shapes but for her all these use of geometry is connected with the procedure of designing a cloth. Moreover, she perceived the presence of the train on the background of this painting as a metaphor for fashion –relating it to certain fashion trends that come and go. Some of them compared geometry to reality. A merchant/trader said that all this sharp geometry reminds her of the cruelty that sometimes characterizes real life. On the contrary, an undergraduate student said that in all this geometry he recognizes the practical aspects of everyday life.

A variety of emotions and thoughts were expressed as a reaction to observing closely the paintings. Some of them expressed positive feelings mostly due to the use/presence of vivid colours. Few claimed that they felt melancholic due to lack of animate entities such as people, trees and sea. Others had mixed feeling. Describing "El placer de poeta" for example, the dressmaker stated that even though the deserted landscape evokes loneliness the presence of vivid yellow reverses this feeling to a wormer one. Most of the participants expressed negative feelings for "La Melancholie d' une belle Journée" mostly due to the dark colours. However, according to the photographer, this image is funny because he felt an irony between the statue and the depicted human figure. He didn't like so much this particular image though. Pleasant feelings, such as happiness or even nostalgia, were also expressed from those who recognized certain elements which refer to the city of Volos (e.g. the train, the arches, the mountain etc.). Several participants connected their emotions to particular geometries. A secretary said that the mannequin depicted in "Troubadour" seems sad due to the position of its head. However, the same geometry was identified by the photographer as less hostile (in comparison with the mannequins depicted in "Masks"). A woman that works on public services stated that the entire geometry of "Trobadour" evoke her fear because it reminds her robot. The builder felt that "Trobadour" is a person trapped in geometry while he argued that there are several mistakes on the representation of some

components constituting “El Placer de Poeta”.

Concerning the significance of geometry in their work, seventeen out of twenty-six of the locals answered positively. Nine of them were strongly positive for the presence of geometry in their lives, five of them expressed ambivalence and only three answered negatively. One of the two dressmakers met stated that the entire procedure of designing a cloth is totally based on the use of geometry. She even demonstrated the designing process to students and presented them with the standard tools that she uses –a ruler and a triangle with embedded curves. On the contrary, the other dressmaker wasn’t aware of the presence of geometry in her work so she almost avoided the question. The shoemaker stated that his profession is not related in any way to geometry. The same statement was made by a female trader, but she recognized the presence of mathematics in her work as money-exchange. The builder claimed that a person with limited knowledge of geometry cannot really become a builder. Geometry is of significant importance for the professions of electrician and agriculturist. They both stated that they apply geometry in order to design systems related to their work (i.e. elevators, irrigation networks). A pedestrian claimed that geometry is omnipresent and a pet shop owner that geometry is the beginning and the end of the entire universe. Various ambivalent and negative responses came from school based subjects such as teachers, parents and students. Specifically, a young teacher reported that she used a lot of geometry in her profession since she has to teach it to young children, sounding as if she tight to this obligation. A mother said that she uses geometry only when she has to help her kids for school homework. And the most spontaneous response came from a student who said that sometimes she does geometry when she draws shapes on her notebook, when she gets bored during the class.

ECHOES OF GEOMETRY

According to de Sanna (2004) de Chirico’s metaphysical spaces and landscapes manage to aggregate “two extremities of history”, meaning Pythagorean harmony and modern mathematical physics. Therefore, apart from representations related implicitly or explicitly to the city of Volos that recreate connections with present time, a semblance of platonic solids and non-Euclidean geometries can be traced in his paintings existing together but not always in harmony. It was interestingly revealing how student-teachers, students and locals together as part of the AnthropoGeometries project were able to tap into complex ideas concerning the horizons of geometry through geo-body political languages. We cannot claim that disruptions to mainstream hegemonic discourses such as ‘geometry is everywhere’ or ‘we all use geometry in daily life’ could come easily as the result of such place-based encounters. However, the hybrid of people’s spontaneous responses has provided a rich tapestry to continue work with towards interrogating the polyphonic echoes of geometry as presented above.

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